Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993	)	WT Docket No. 17-69
	)	
Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services	)	
	)	

To: The Commission

COMMENTS OF VERIZON

William H. Johnson
Of Counsel

Leora Hochstein
Charla Rath

VERIZON
1300 I Street, NW
Suite 400 West
Washington, DC 20005
(202) 515-2535

May 8, 2017

TABLE OF CONTENTS

EXECUTIVE SUMMARY i

I. IT IS LONG PAST TIME TO CONCLUDE THAT THE MOBILE MARKETPLACE IS SUBJECT TO EFFECTIVE AND INTENSE COMPETITION 1

II. CONSUMERS ARE BENEFITING FROM A ROBUSTLY COMPETITIVE WIRELESS MARKET 8

A. Competition Is Intense Across Pricing, Plans, and Other Factors. 9

1. Voice and Data Prices Are Declining Dramatically. 9

2. Competition Is Driving Transformative New Data Plans, Including Unlimited and Free Data Offerings 11

3. Carriers Are Competing on Network Quality and Innovation, Spurring Network Investment. 14

B. Increasing Competition from MVNOs and Non-Traditional Sources Continues to Promote a Dynamic Consumer Experience. 19

1. Consumers Can Choose From a Diverse Selection of Facilities-Based Operators and MVNOs. 19

2. Newer Providers are Intensifying Competition. 23

C. The Competitive Marketplace is Driving Rising Consumer Satisfaction. 26

1. Surveys Consistently Report High Levels of Satisfied Customers. 26

2. Consumer Complaints are Minimal. 28

D. The U.S. Market Continues to Lead the World. 28

III. COMPETITION FOR SPECTRUM IS INTENSE 30

A. FCC Auctions Have Distributed Licensed Spectrum to a Broad Array of Competitors. 30

B. Unlicensed Spectrum Helps Meet Increasing Consumer Demand for Data and Drives Additional Competition. 31

IV. CONCLUSION 33

EXECUTIVE SUMMARY

Falling prices. Rising usage. Robust investment. Vibrant consumer choice. Boundless innovation. These are the telltale signs of a competitive market and the hallmarks of today's wireless marketplace. When the Commission looked at data in 2009, it found that the U.S. wireless market was effectively competitive. It has only grown more so with each passing day. But contrary to facts showing the continued vibrancy and dynamism of the wireless market, the past Commission in recent years refused to find the nation's mobile marketplace competitive. This Commission should no longer turn a blind eye to marketplace and competitive realities. It is long past time to return to an objective analysis of the facts and acknowledge that the dynamic U.S. mobile wireless marketplace is effectively competitive.

Data on market performance show that American consumers are at the center of a hotly competitive mobile marketplace.

- ***Falling prices***. From March 2016 to March 2017, the wireless Consumer Price Index ("CPI") fell 11.4 percent, even as the U.S. CPI for all items rose 2.4 percent. Since 2009, wireless CPI has *fallen* more than 23 percent, while the overall CPI has *increased* almost 15 percent.
- ***Exploding demand/usage***. Usage continues to rise: total U.S. mobile data traffic reached 1.3 exabytes per month in 2016, up 44 percent from 2015. And U.S. mobile data traffic is expected to grow five-fold by 2021.
- ***Robust investment***. U.S. providers invested more than $32 billion in their networks in 2015, and cumulatively have invested over $300 billion over the last ten years.
- ***Consumer choice.*** Nearly 96 percent of consumers can choose from three or more facilities-based mobile broadband providers and nearly 90 percent of consumers have access to four or more such providers. These providers are competing fiercely for consumers,

including with unlimited and free data plans that are "reshaping the wireless competitive landscape," according to one analyst.

- ***Emerging Competitors***. Today, competitors extend beyond traditional providers to include Wi-Fi-based providers, MVNOs, and over-the-top VoIP, video-chat, messaging, and social media apps.

Because of intense competition in the U.S. marketplace, we are leading the world in developing 5G – the next generation of wireless broadband technology. 5G promises data speeds that are many times faster than 4G LTE, and it will drive the growth of the Internet of Things. Verizon is at the forefront of this wireless revolution, planning to be the first carrier to offer 5G service, just as it was the first to broadly deploy 4G LTE.

The facts are clear and consistent: U.S. consumers are benefiting from a dynamic, innovative wireless marketplace that is connecting everything and everyone in new ways and giving consumers more choices than ever before to meet their communications needs. And notably, in this vibrant, competitive market characterized by innovation, dynamism, and change, consumers continue to give high marks to their wireless providers.

Given all the evidence of fierce competition in the mobile wireless ecosystem, this Commission should correct course in the *Twentieth Report.* The facts lead to only one defensible conclusion: the mobile services market is effectively and intensely competitive. To ensure that the United States maintains world leadership in wireless broadband, it is critical that the FCC acknowledge that the market is competitive and make policy choices based on this finding.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993	)	WT Docket No. 17-69
	)	
	)	
Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services	)	
	)	

To: The Commission

COMMENTS OF VERIZON

Verizon[1] submits these initial comments in response to the Wireless Telecommunications Bureau's *Public Notice* seeking input and data on mobile wireless competition for the Twentieth Annual Report on the State of Competition in Mobile Wireless.[2]

I. IT IS LONG PAST TIME TO CONCLUDE THAT THE MOBILE MARKETPLACE IS SUBJECT TO EFFECTIVE AND INTENSE COMPETITION

In 1993, Congress charged the Commission with annually answering a seemingly straightforward question: "whether or not there is effective competition" in the mobile marketplace.[3] For the past seven years, the Commission has distorted and eschewed this task, and instead drafted *Reports* that resemble confounding detective novels. Each has presented a rich tapestry of clues, all pointing toward a single conclusion – namely, that the mobile wireless marketplace is not only "effective[ly]," but *intensely*, competitive. And yet, each has also contained

[1] The Verizon companies participating in this filing are the regulated, wholly-owned subsidiaries of Verizon Communications Inc. (collectively "Verizon").

[2] *Wireless Telecommunications Bureau Seeks Comment on the State of Mobile Wireless Competition*, Public Notice, 32 FCC Rcd 1950 (WTB 2017).

[3] 47 U.S.C. § 332(c)(1)(C).

a shocking twist, in which the narrator – seemingly indifferent to mounds of data and analysis it cites – declares that the mystery cannot be solved. Thus, for example, the *Nineteenth Report* announced only that, "[g]iven the complexity of the various inter-related segments and services within the mobile wireless ecosystem, any single conclusion regarding the effectiveness of competition would be incomplete and possibly misleading …."[4]

This result is not only unsatisfying, but – more important – wrong. As Chairman Pai has correctly stated, "the [wireless] marketplace right now is extremely competitive [and] delivering unparalleled value to consumers."[5] It has only become more competitive over time, generating ever-increasing benefits for consumers and driving growth and employment throughout the economy.[6] The time has come for the Commission to reject the "ostrich-like" approach of the recent past, and to recognize that the wireless marketplace is, indeed, effectively competitive.[7]

Antitrust scholars and policy-makers have long recognized that analysis of competition within an industry should look at both providers' conduct (*i.e.*, market performance) and market

[4] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Nineteenth Report, 31 FCC Rcd 10534, 10537 ¶ 4 (2016) ("*Nineteenth Report*").

[5] CNBC Transcript: FCC Chairman Ajit Pai Speaks With CNBC's "Squawk on the Street" Today (Feb. 22, 2017). As Commissioner O'Rielly put it in 2015: "It amazes me that with more than 90 percent of Americans having a choice of four or more wireless providers that we are incapable of concluding, as directed by Congress, whether this industry is competitive." Michael O'Rielly, Commissioner, FCC, Statement on the 18th Annual Wireless Competition Report (Dec. 23, 2015).

[6] As then-Commissioner Pai noted in 2015, the mobile marketplace is significantly more competitive than the market for video offerings, which the Commission has found to be effectively competitive. *See* Ajit Pai, Commissioner, FCC, Statement on the FCC's Ostrich-Like Approach to Competition in the Wireless Market (Dec. 23, 2015) ("*Pai 2015 Statement*"), *citing Amendment to the Commission's Rules Concerning Effective Competition*, Report and Order, 30 FCC Rcd 6574 (2015); *see also Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming*, Sixteenth Report, 30 FCC Rcd 3253 (2015).

[7] *Id*.

structure (*i.e.*, market concentration).[8] AEI Scholar Jeffrey Eisenach has observed that concentration levels in the broadband market do not fully reflect the nature of competition: "strong performance in terms of output expansion, innovation, and other metrics" must be weighed, too.[9] As leading communications economists Gerald R. Faulhaber (former FCC Chief Economist), Robert W. Hahn, and Hal J. Singer have put it, in order to "reach a more informed competitive assessment," the agency must "directly assess performance" by weighing "the relevant direct market evidence."[10] The Federal Trade Commission and the Department of Justice agree, stating in the most recent Horizontal Merger Guidelines that "[m]arket shares may not fully reflect the competitive significance of firms in the market" and thus, must only be consulted in conjunction with other evidence of the state of competition.[11]

---

[8] *See, e.g.*, Scott Wallsten, *The FCC's New Wireless Competition Report: The Right Way to Look at the Industry*, Technology Policy Institute Blog (May 22, 2010), http://www.techpolicyinstitute.org/blog/2010/05/the-fcc%e2%80%99s-new-wireless-competition-report-the-right-way-to-look-at-the-industry/. https://techpolicyinstitute.org/2010/05/22/the-fccs-new-wireless-competition-report-the-right-way-to-look-at-the-industry/In the words of economists Gregory Rosston and Michael Topper: "While structural measures such as HHIs provide a starting place, industry structure is just a first step in an antitrust analysis assessing the competitiveness of the wireless market. The next step is to assess the actual performance of the industry, as measured by prices and quantities consumed." GREGORY L ROSSTON & MICHAEL D. TOPPER, AN ANTITRUST ANALYSIS OF THE CASE FOR WIRELESS NETWORK NEUTRALITY, STANFORD INSTITUTE FOR ECONOMIC POLICY RESEARCH, AT 21 (Aug. 2009), http://siepr.stanford.edu/publicationsprofile/1989.

[9] Jeffrey Eisenach, *Broadband Competition in the Internet Ecosystem*, AEI Economic Studies, at 4 (Oct. 2012).

[10] Gerald R. Faulhaber, Robert W. Hahn & Hal J. Singer, *Assessing Competition in U.S. Wireless Markets: Review of the FCC's Competition Reports*, 64 Federal Communications Law Journal 319, 321-222 (2012), http://www.repository.law.indiana.edu/cgi/viewcontent.cgi?article=1616&context=fclj. *See also* Jerry Duvall & Michael Pelcovits, *Reforming Regulatory Policy for Private Line Telecommunications Services: Implications for Market Performance* (FCC Office of Planning and Policy Working Paper No. 4, 1980), https://transition.fcc.gov/Bureaus/OPP/working_papers/oppwp4.pdf (analysis should focus on market performance, rather than on market participants' residual market power).

[11] U.S. DEPARTMENT OF JUSTICE AND FEDERAL TRADE COMMISSION, HORIZONTAL MERGER GUIDELINES § 5.3 (issued Aug. 19, 2010), http://www.justice.gov/atr/public/guidelines/hmg-

Even focusing on market structure, it is clear that today's mobile market is highly competitive as evidenced by the number and variety of competitors and services: the four nationwide providers have each constructed vast 4G LTE networks that provide high-speed data services to virtually all Americans. They are at work provisioning new iterations of 4G service, and are making preparations to deploy revolutionary 5G technology. Regional and local providers also offer 4G speeds, including in hard-to-serve rural areas. Mobile virtual network operators ("MVNOs") have further sharpened competitive forces, using existing networks to target specific market segments. And cable companies are trying to match features offered by wireless carriers through their rollout of Wi-Fi hotspots. Comcast alone has deployed 16 million hotspots.[12] The marketplace is poised to become even more crowded, with well-heeled providers such as DISH and Comcast winning large swaths of 600 MHz spectrum in the recently concluded incentive auction.

The most relevant and powerful information regarding the mobile marketplace's competitiveness, however, concerns providers' *conduct*. As Verizon details below, the wireless marketplace's performance reflects a highly competitive industry. For example, between March 2016 and March 2017, the Wireless Telephone Services component of the Consumer Price Index

---

2010.html . *See also Applications of Cellco Partnership d/b/a Verizon Wireless and Atlantis Holdings LLC*, 23 FCC Rcd 17444, 17489 ¶ 94 (2008) (noting that the Commission applies a "multi-factor, market-specific analysis" drawing "conclusions based on the totality of the circumstances present in a given market ...."); Michael L. Katz & Howard A. Shelanski, *"Schumpeterian" Competition and Antitrust Policy in High-Tech Markets*, 14 COMPETITION 47, at 10 (2005) ("[C]urrent product-market shares may indicate very little about the future of the industry or about whether any given firm will possess significant market power."); PHILLIP E. AREEDA & HERBERT HOVENKAMP, ANTITRUST LAW: AN ANALYSIS OF ANTITRUST PRINCIPLES AND THEIR APPLICATION § 506d (Aspen Publishers 2007) ("Substantial market power can persist only when there are significant and continuing barriers to expansion and entry.").

[12] Press Release, Comcast, *Comcast Introduces Xfinity Mobile: Combining America's Largest, Most Reliable 4G LTE Network and the Largest Wi-Fi Network* (Apr. 6, 2017), http://cmcsa.com/releaseDetail.cfm?ReleaseID=1020449.

("wireless CPI") declined *11.4 percent*,[13] even as the general CPI for all goods *increased* by 2.4 percent.[14] ARPU continues to fall as well.[15] And diverse new billing options – including a bevy of plans offering unlimited or free data – are continuing to benefit consumers. As one analyst concluded just last month:

> It should come as no surprise that Wireless remains fiercely competitive, with 1Q bringing the return of Verizon Unlimited, a revamped Unlimited offering at AT&T, new pricing promotions at Sprint, and the elimination of taxes/fees at T-Mobile.[16]

Meanwhile, providers' investments in network performance, coverage, and customer care are further enhancing the wireless experience. Providers have collectively spent hundreds of billions of dollars improving and expanding their networks – $300 billion over the last 10 years, and more than $32 billion in 2015 alone.[17] Such investments continue to fuel innovation and drive customer value. And we are rapidly moving to the next generation of wireless broadband

[13] U.S. Dep't of Labor, Bureau of Labor Statistics, Consumer Price Index for All Urban Consumers (CPI-U): U.S. City Average, by Detailed Expenditure Category, Table 2 (Mar. 2017), https://www.bls.gov/news.release/cpi.t02.htm ("CPI Data 2017"). Within the "Wireless telephone service" category, "[a]ll service charges, applicable per-plan charges or per-minute call charges, and other charges [that are] normally included in a cellular plan are eligible for pricing" and "Internet access is also eligible." U.S. Dep't of Labor, Bureau of Labor Statistics, Consumer Price Index, *How the Consumer Price Index Measures Price Change for Telephone Services*, https://www.bls.gov/cpi/cpifactc.htm (last modified May 26, 2016).

[14] CPI Data 2017.

[15] Chetan Sharma Consulting, *Highlights of the US Mobile Market 2016*, http://www.chetansharma.com/publications/us-mobile-market-update-2016/ (last visited May 3, 2017).

[16] Jefferies, *Telecom Services, Unlimited Plans Highlight Competitive Pressures*, Industry Note (Apr. 3, 2017).

[17] *See* CTIA Wireless Annual Survey, Year-End U.S. Figures from CTIA's Annual Survey Report (Dec. 2015), http://www.ctia.org/industry-data/ctia-annual-wireless-industry-survey ("CTIA 2015 Wireless Annual Survey").

technology. Some analysts expect that by 2022, 25 percent of North American mobile subscriptions will be 5G.[18]

Growth in Americans' demand for mobile service underscores that consumers continue to find substantial value in wireless and the competitiveness of the market. Total U.S. mobile data traffic doubled during 2015[19] to a level nearly 25 times greater than in 2010,[20] and Cisco projects that mobile data traffic in the United States will grow five-fold between 2016 to 2021.[21]

The marketplace has become vastly more competitive over time. A decade ago, in 2007, the Commission had not yet auctioned licenses for the 700 MHz spectrum – the first band used for 4G LTE. Apple was a month away from releasing the first iPhone, initiating the smartphone era. There were no apps to access Twitter and Facebook. Mobile wireless usage was a tiny fraction of what it is today. And, citing concerns that providers might take actions to deprive consumers of exciting new features on "handsets" or restrict the emergence of applications, the Commission adopted requirements for the Upper 700 MHz C Block to mandate regulated access on that spectrum band.[22] Even a comparison against 2009 – the last year in which the Commission found the mobile

---

[18] Ericsson, Ericsson Mobility Report: On the Pulse of the Networked Society, 9 (Nov. 2016), https://www.ericsson.com/assets/local/mobility-report/documents/2016/ericsson-mobility-report-november-2016.pdf ("Ericsson Mobility Report").

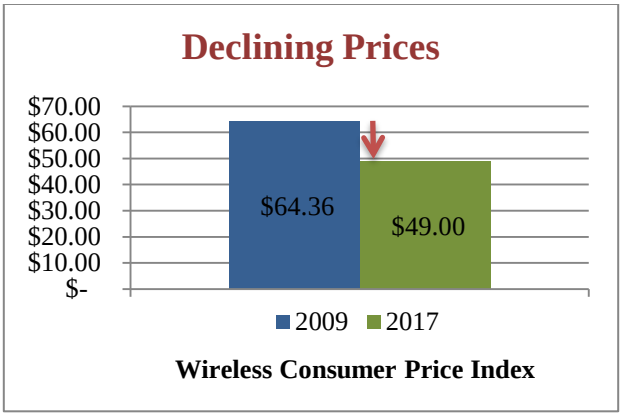
[19] Press Release, CTIA, Americans' Data Usage More than Doubled in 2015 (May 23, 2016), http://www.ctia.org/industry-data/press-releases-details/press-releases/americans-data-usage-more-than-doubled-in-2015.

[20] Dr. Robert F. Roche & Kathryn Malarkey, *CTIA's Wireless Industry Indices Report, Year-End 2015 Results*, at 97 (July 2016).

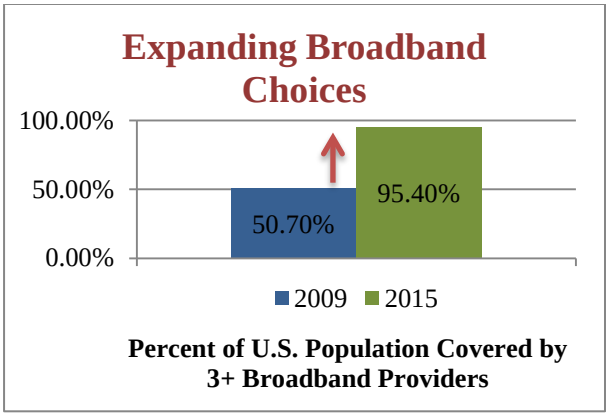
[21] Cisco, V*NI Mobile Forecast Highlights, 2016-2021, Find highlights based on location and category*, http://www.cisco.com/assets/sol/sp/vni/forecast_highlights_mobile/#~Country (last visited May 4, 2017) ("Cisco VNI Mobile Forecast Highlights").

[22] 47 C.F.R. § 27.16; *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, Second Report and Order, 22 FCC Rcd 15289, 15358-65 ¶¶ 189-206 (2007).

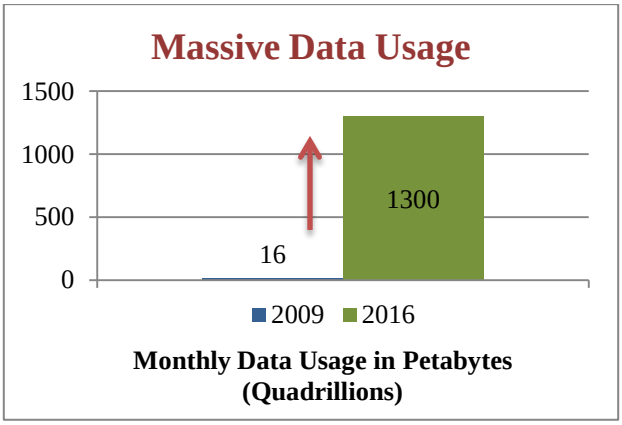
marketplace to be effectively competitive – reveals a vast chasm between the marketplace of today and that of the relatively recent past:



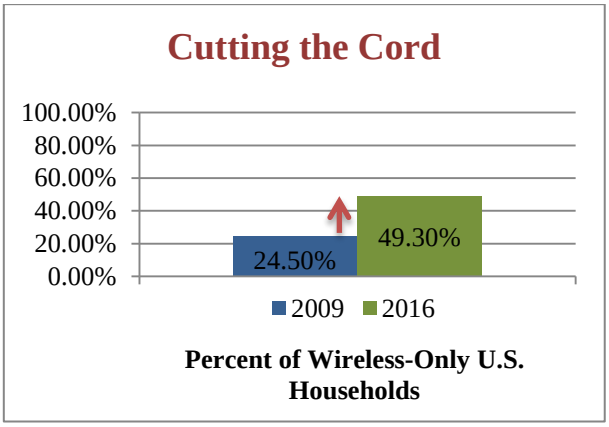
Source: Consumer Price Index for All Urban Consumers, tbl. 3 (2009), https://www.bls.gov/cpi/cpid0903.pdf; CPI Data 2017 tbl. 3.



Source: *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Thirteenth Report, 24 FCC Rcd 6185, 6258, Table 10 (2009) ("*Thirteenth Report*"); *Nineteenth Report*, 31 FCC Rcd at 10636, Charts III.A.ii & III.A.iii.



Source: Thomas K. Sawanobori & Dr. Robert Roche, CTIA, *Mobile Data Demand: Growth Forecasts Met*, at 1 (June 2015), http://www.ctia.org/docs/default-source/default-document-library/062115mobile-data-demands-white-paper-new.pdf; Cisco VNI.



Source: Stephen J. Blumberg & Julian V. Luke, National Center for Health Statistics, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, July–December 2009* at 1 (May 12, 2010); Stephen J. Blumberg & Julian V. Luke, National Center for Health Statistics, *Wireless Substitution: Early Release of Estimates From the National Health Interview Survey, January–June 2016* at 1 (Dec. 2016).

As competitive as the mobile market was in 2009, the variety and versatility of mobile products and services have exploded over the last eight years, fueling today's vigorous competition among mobile providers and dynamic competition more generally. The rise of smartphones following the iPhone and unlimited data plans long ago spelled doom for the "walled garden" model for accessing the Internet via mobile phone that was prevalent before 2009. Consumers' voracious

demand for Internet access and mobile applications and the ready availability of alternatives, simply make it impossible for wireless carriers to restrict usage to their own products and services, even if they wanted to. To meet the demand for data usage, Wi-Fi is now integrated into nearly all of Verizon's devices. And switching providers to get the "next best" data plan and/or pricing has become ever more attractive as multi-band devices flood the market and carriers have made it easier for their customers to take their phones to other networks.

As Chairman Pai has emphasized, "[b]edrock principles of good government require that [the Commission] make fact-based decisions that reflect marketplace realities."[23] One need not be Sherlock Holmes to interpret the evidence presented here. There is no mystery. The mobile wireless market is fiercely competitive. The decision to conclude as much should be, in a word, "elementary."

II. CONSUMERS ARE BENEFITING FROM A ROBUSTLY COMPETITIVE WIRELESS MARKET

For consumers, wireless service in the United States is a buyer's market. The market is dynamic, with prices dropping, the frequent introduction of new and innovative service plans, and robust network investments in next-generation technologies, all resulting in high consumer satisfaction. Providers' conduct is the result of the industry's fierce competitiveness, and the Commission should find that there is "effective competition" in the wireless marketplace.[24]

[23] *Pai 2015 Statement.*

[24] 47 U.S.C. § 332(c)(1)(C).

A. Competition Is Intense Across Pricing, Plans, and Other Factors.

1. Voice and Data Prices Are Declining Dramatically.

Wireless companies are engaged in an intense competitive battle with "price as the weapon of choice."[25] With wireless pricing dropping dramatically and data usage climbing rapidly, consumers are capturing even greater value for each dollar spent.

Mobile wireless prices fell dramatically since the *Nineteenth Report* according to two key pricing indicators relied on by the Commission in prior *Reports* – wireless CPI and Average Revenue Per Unit ("ARPU").[26] Data pricing in particular is falling precipitously.

First, the wireless CPI *declined 11.4 percent* in just the last year alone, from March 2016 to March 2017,[27] even as the general CPI for all goods increased by 2.4 percent.[28] In just one month, from February to March 2017, wireless prices fell a record 7 percent, largely because of new data plans.[29] Since 2009, wireless CPI has significantly fallen by more than 23 percent,[30] even as the

---

[25] American Customer Satisfaction Index, ACSI Telecommunications Report 2016, at 9 (June 1, 2016), http://theacsi.org/news-and-resources/customer-satisfaction-reports/reports-2016/acsi-telecommunications-report-2016/acsi-telecommunications-report-2016-download ("ASCI Telecommunications Report 2016"); Jeffry Bartash, *Wireless price wars are cutting your phone bills* (Apr. 14, 2017), http://www.marketwatch.com/story/wireless-price-wars-are-cutting-your-phone-bills-2017-04-14.

[26] *See Nineteenth Report*, 31 FCC Rcd at 10555-58 ¶¶ 27-29.

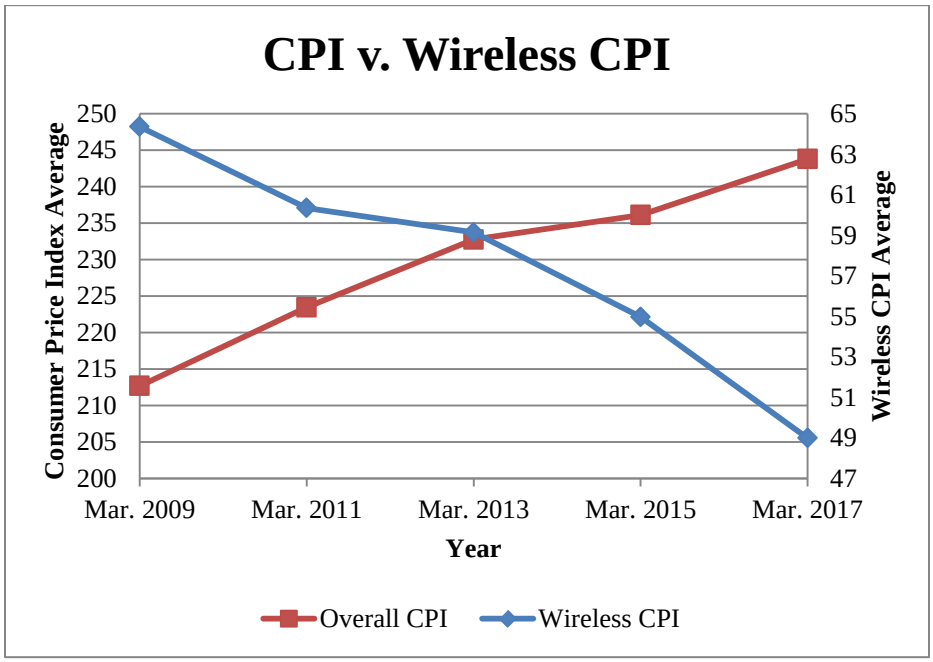
[27] CPI Data 2017.

[28] *Id*.

[29] *Id*.; *see also* Jeffry Bartash, *Wireless Price Wars Are Cutting Your Phone Bills*, MarketWatch (Apr. 14, 2017), http://www.marketwatch.com/story/wireless-price-wars-are-cutting-your-phone-bills-2017-04-14.

[30] The wireless CPI in March 2009 and March 2017 was 64.361 and 49.002, respectively. *See* CPI Data 2017, Table 3; *see also* U.S. Dep't of Labor, Bureau of Labor Statistics, *CPI Detailed Report Data for March 2009*, Table 3, 18 (2009), https://www.bls.gov/cpi/cpid0903.pdf ("CPI March 2009") *and* U.S. Dep't of Labor, Bureau of Labor Statistics, *CPI Detailed Report Data for March 2017*, Table 3, 13 (2017), https://www.bls.gov/cpi/cpid1703.pdf ("CPI Detailed March 2017").

general CPI increased more than 14 percent over the same 2009-2017 period.[31] And by comparison, as the cost of wireless services has fallen, the price of other consumer services such as transportation has risen over 18 percent and food has risen over 14 percent.[32] The overall and wireless CPI trends over the last eight years are depicted in the chart below:



Overall CPI change over the last eight years contrasted with the isolated wireless CPI over the same timeframe.

ARPU shows similar declines. According to the Commission, the ARPU metric "has commonly been used in the industry as an overall pricing indicator" and "remains the best such measure currently used by industry and financial analysts."[33] In 2016, the overall monthly service

[31] The general CPI in March 2009 and March 2017 was 212.709 and 243.801, respectively. *See* CPI March 2009, Table 1, 9 *and* CPI Detailed March 2017, Table 1, 4.

[32] *See* CPI March 2009, Table 3, 16 *and* CPI Detailed March 2017, Table 3, 11.

[33] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Seventeenth Report, 29 FCC Rcd 15311, 15328 ¶ 36 (2014).

ARPU figure continued to decline and, in the first quarter, fell below $40 for the first time.[34] These indicia of market performance reveal robust competition.

At the same time, the mobile wireless value proposition continues to grow. Data prices continue to fall, and overall mobile usage is rising – driving home even more value for every consumer dollar. Total U.S. mobile data traffic reached 1.3 exabytes per month in 2016, up an astounding 44 percent from 2015.[35] The number of SMS and Multimedia Messaging Service ("MMS") messages combined increased by over 40 billion from 2014 to 2015 (from 2.07 trillion to 2.11 trillion).[36] And even in a data-centric world, Total Minutes of Use ("MOUs") grew from 2.455 trillion in 2014 to 2.881 trillion in 2015.[37] Together, these trends reinforce the ever-increasing value consumers are receiving for their wireless dollars: prices are declining while consumers' use is increasing.

2. Competition Is Driving Transformative New Data Plans, Including Unlimited and Free Data Offerings.

Providers are also fiercely competing for consumers by offering an increasingly diverse array of innovative, consumer-friendly service plans and options. Consumers can choose from postpaid and prepaid plans, individual and shared plans, some plans with subsidized devices and others without. Most significantly, however, providers are fiercely competing for consumers through the offering of unlimited data plans and free data. As one analyst recently commented, the

[34] Chetan Sharma Consulting, *US Mobile Market Update – Q1 2016*, http://www.chetansharma.com/us-mobile-market-update-q1-2016/ (last visited May 3, 2017).

[35] Cisco VNI Mobile Forecast Highlights.

[36] CTIA 2015 Wireless Annual Survey.

[37] *Id*.

introduction of these unlimited plans is "reshaping the wireless competitive landscape."[38] By the first quarter of 2017, all major carriers introduced aggressive unlimited data plans and promotions:[39]

- *Verizon*. Verizon began offering an unlimited family data plan of four lines for $180 and an unlimited single line for $80 per month.[40]

- *T-Mobile*. T-Mobile began offering an unlimited plan of one line for $70, two lines for $100, three lines for $140, and four lines for $160 in which taxes and fees are included.[41]

- *Sprint*. Sprint offered a promotion from February to April 2017 featuring five lines with unlimited data for $90.[42] Its current Unlimited Freedom promotion offers two lines of unlimited talk, text, and data for $80 per month.[43]

- *AT&T*. AT&T offers an unlimited single line for $90 per month and expands unlimited data to all wireless customers, not just those bundling video. It also offers an unlimited "CHOICE" plan of one line for $60 per month.[44]

- *US Cellular*. US Cellular also offers unlimited data plans, including one featuring four lines for $160, and another with one line for $70.[45]

As highlighted above, the introduction of these plans has radically changed the marketplace and the experience of consumers.

Providers are also experimenting with new types of free or sponsored data services to see what both appeals to customers and provides value to sponsors.[46] For example, in 2016, Verizon

---

[38] Wireless Pricing/Promotions Update at 2, RBC Capital Markets Equity Research (Mar. 16, 2017).

[39] Telecom Services Update, *A Quarter to Forget*, MORGAN STANLEY (Apr. 5, 2017).

[40] Verizon Plans, https://www.verizonwireless.com/plans/verizon-plan/ (last visited May 4, 2017).

[41] T-Mobile Plans, https://www.t-mobile.com/cell-phone-plans (last visited May 4, 2017).

[42] Lulu Chang, *Family of Five? Sprint Offers Unlimited Talk, Text, and Data for $90 a Month* (Feb. 10, 2017), http://www.digitaltrends.com/mobile/sprint-unlimited-promotion/.

[43] Sprint Plans, https://www.sprint.com/landings/unlimited-cell-phone-plans/index.html?INTNAV=TopNav:Shop:UnlimitedPlans (last visited May 4, 2017).

[44] AT&T Plans, https://www.att.com/plans/unlimited-data-plans.html (last visited May 4, 2017).

[45] US Cellular Plans, https://www.uscellular.com/uscellular/plans/showPlans.jsp?plan-selector-type=voice-messaging&type=plans#listing (last visited May 4, 2017).

introduced FreeBee, a free data service that allows content providers, on a non-discriminatory basis, to offer consumers new content and services that does not count against customers' data plans.[47] Surveys say that consumers overwhelmingly support these offers.[48] Moreover, free data plans can be a valuable tool in closing the digital divide by providing households that rely heavily on mobile devices for Internet connectivity (often low-income or people of color) access to more content either as part of a free data program or by using an original data allotment that was not used on the free content.[49]

As demonstrated above, consumers can select a plan from among the various carriers' competitive pricing options that best suits their individual needs. A wide variety of resources is available to consumers to help them determine which services and pricing plans are best for them.[50] For example, on one website, a consumer can select the type of phone, amount of data, and the number of minutes, messages, and lines he or she would like. The website then automatically

---

[46] *See, e.g.*, Dr. Robert Roche, *America Loves #FreeData*, CTIA Blog (Apr. 7, 2016) ("Roche Blog"), http://www.ctialatest.org/2016/04/07/americans-love-freedata/ (there is overwhelming support for free data services among U.S. adults of all ages).

[47] Verizon Wireless, *What is FreeBee Data?*, https://freebee.verizonwireless.com/ (last visited May 4, 2017).

[48] *See, e.g.*, Roche Blog (there is overwhelming support for free data services among U.S. adults of all ages).

[49] *See generally id.*

[50] *See, e.g.*, ConsumerReports, http://www.consumerreports.org (last visited May 4, 2017); J.D. Power, http://www.jdpower.com (last visited May 4, 2017); Wirefly, http://www.wirefly.com/content/phone-plans (last visited May 4, 2017); Deadcellzones.com, http://www.deadcellzones.com/ (last visited May 4, 2017); MyRatePlan, http://www.myrateplan.com/ (last visited May 4, 2017); WhistleOut, http://www.whistleout.com/CellPhones (last visited May 4, 2017).

generates the plan best suited to his or her needs.[51] This is yet another example of how the mobile ecosystem is working for consumers.

3. Carriers Are Competing on Network Quality and Innovation, Spurring Network Investment.

While carriers are competing aggressively on pricing and plan options, the Commission has rightly recognized that mobile wireless service providers also compete "on dimensions other than price, including capacity and investment, network coverage and technology, service quality, and advertising and marketing."[52] As described below, these vectors also point to a robustly competitive market.

Network Quality. Consumers consistently rank network performance and coverage as key variables in choosing a service provider. The *Nineteenth Report* appropriately acknowledged carriers' significant capital expenditures ("CAPEX") aimed at enhancing network performance and coverage, and that providers may use CAPEX decisions "to differentiate their service offerings from those of their rivals by becoming the first to deploy a particular upgrade or new network technology."[53]

Wireless providers have collectively spent hundreds of billions of dollars improving and expanding their networks to compete for customers – $300 billion over the last 10 years, and $32 billion in 2015 alone.[54] In 2015, AT&T and Verizon each invested more in U.S. infrastructure than any other U.S. company.[55] Verizon's 4G LTE network is the largest in the industry, covering more

---

[51] Wirefly, *Compare Cell Phone Plans – Find the Best Cell Phone Plan*, http://www.wirefly.com/content/phone-plans (last visited May 4, 2017).

[52] *Nineteenth Report*, 31 FCC Rcd at 10599 ¶ 94.

[53] *See id*. at 10552 ¶ 23.

[54] *See* CTIA 2015 Wireless Annual Survey.

[55] Progressive Policy Institute, *Investment Heroes 2016: Fighting Short-termism*, at 5 (2016), http://www.progressivepolicy.org/wp-content/uploads/2016/10/InvestHeroes_2016.pdf.

than 2.4 million square miles and over 98 percent of Americans in more than 500 markets.[56] Verizon's LTE Advanced network now covers more than 450 markets, providing customers with 50 percent faster peak speeds in cities nationwide.[57] This heavy investment in network upgrades and infrastructure has made Verizon's network "ready for anything" – including unlimited data plans.[58] Since launching unlimited, Verizon has had no capacity issues, as the network "had been engineered to handle higher usage."[59]

This level of investment is driven by competition – a race to the top to build the fastest, most reliable and versatile network – and consumers are the beneficiaries. In turn, these investments are driving growth in downstream markets, devices, infrastructure, and other segments – all to the benefit of U.S. consumers. In 2016 alone, the typical smartphone user in the United States generated 4,432 megabytes of data traffic per month, up from 3,333 megabytes per month in

[56] Verizon, *Better Matters*, https://www.verizonwireless.com/featured/better-matters/ (last visited May 4, 2017); Verizon, Annual Report (Form 10-K) at 3 (Feb. 21, 2017), http://verizon.api.edgar-online.com/EFX_dll/EdgarPro.dll?FetchFilingConvPDF1?SessionID=6Xv1qAa37_X0DiA&ID=11871260.

[57] Verizon, *Welcome to the next gen network*, https://www.verizonwireless.com/featured/lte-advanced/ (last visited May 4, 2017).

[58] Ronan Dunne, *11.2B Reasons Why I'm Excited About the Future of Wireless,* Linked In Blog (Feb. 13, 2017), https://www.linkedin.com/pulse/112b-reasons-why-im-excited-future-wireless-ronan-dunnehttps://www.linkedin.com/pulse/112b-reasons-why-im-excited-future-wireless-ronan-dunne ("We've designed our unlimited plan without limits on where, when and how you use it on our 4G LTE network. It includes features like HD Video and 4G Hotspots and keeps us one step ahead of what our customers need.").

[59] Goldman Sachs Equity Research , *Verizon Communications (VZ): Takeaways from meeting with Verizon's head of Network Technology Planning*, at 1 (Mar. 29, 2017).

2015.[60] And looking ahead, between now and 2020, mobile data traffic per U.S. user is expected to grow at a 38 percent compound annual growth rate, reaching nearly 9,000 megabytes per month.[61]

There is a tremendous amount of IoT growth on the 4G network. IoT devices, such as Verizon's Hum, which plugs into a vehicle and offers monitoring, roadside and emergency assistance, and stolen vehicle tracking, will positively disrupt our lives, businesses, and the economy.[62] IoT devices are already beginning to enhance healthcare. Verizon's Intelligent Track and Trace solution, for example, monitors and traces pharmaceutical products moving through the supply chain.[63] In the United States, machine-to-machine modules were roughly 23 percent of device connections in 2016 and are expected to be 58 percent of device connections by 2021.[64]

U.S. providers also are leading the world in investing in and testing the next generation of wireless broadband technology – 5G – which, as Chairman Pai noted, could "transform the wireless world."[65] 5G will offer massive increases in speed, with instantaneous response time. Because it has the ability to handle exponentially more connected devices, it will also greatly increase the availability of IoT. 5G will support a diverse set of applications and uses that promise to enrich the lives of American consumers and enhance U.S. productivity. Furthermore, 5G deployment will

---

[60] *See* Cisco VNI Mobile Forecast Highlights.

[61] GSMA, *The Mobile Economy, North America 2016*, 4 (2016), https://www.gsmaintelligence.com/research/?file=28a21e457f1b516b804f8b0f6cef5815&download ("GSMA 2016").

[62] Hum by Verizon, https://www.verizonwireless.com/solutions-and-services/hum/ (last visited May 4, 2017).

[63] GSMA 2016 at 34.

[64] *See* Cisco VNI Mobile Forecast Highlights.

[65] Ajit Pai, Chairman, FCC, Remarks at Carnegie Mellon University's Software Engineering Institute, Pittsburgh, Pennsylvania: *Bringing the Benefits of the Digital Age to All Americans* at 7 (Mar. 15, 2017); *see Use of Spectrum Bands Above 24 GHz for Mobile Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8022 ¶ 15 (2016) ("*Spectrum Frontiers Order*").

create even more new jobs across the nation. As of today, more than 4.6 million American jobs depend on the wireless industry.[66] 5G is expected to create one new job for every 100 Americans, totaling three million new jobs.[67] And by 2020, 5G will add $1 trillion to the economy in North America.[68] Nowhere is the competitive environment and the race to the top more evident than in this digital transformation, which will touch all aspects of the American economy.

And just as Verizon was the first to launch 4G LTE on a broad scale, it is leading the race to deploy 5G technology in the United States. In 2015, Verizon convened its inaugural 5G Technology Forum to help accelerate the introduction of 5G technology, which at the time was not expected until 2020.[69] In 2016, Verizon was the first U.S. carrier to complete 5G radio specifications.[70] In February 2017, Verizon announced that it would deliver pre-commercial services to select customers in 11 markets throughout the country on its newly built 5G network.[71]

---

[66] *See* Roger Entner, *The Wireless Industry: Revisiting Spectrum, the Essential Engine of US Economic Growth*, RECON ANALYTICS, at 18 (Apr. 2016), http://www.ctia.org/docs/default-source/default-document-library/entner-revisiting-spectrum-final.pdf.

[67] Digital Future Alliance , *5G By the Numbers* (Jan. 26, 2017), https://www.digitalfuturealliance.com/article/5g-by-the-numbers.

[68] Press Release, GSMA, *Mobile Industry to Add $1 Trillion in Value to North American Economy by 2020, Finds New GSMA Study* (Nov. 1, 2016), http://www.gsma.com/newsroom/press-release/mobile-industry-add-1-trillion-value-north-american-economy-2020-finds-new-gsma-study/.

[69] News Release, Verizon, *Verizon sets roadmap to 5G technology in U.S.; Field trials to start in 2016* (Sept. 8, 2015), http://www.verizon.com/about/news/verizon-sets-roadmap-5g-technology-us-field-trials-start-2016.

[70] News Release, Verizon, *Verizon is first U.S. carrier to complete 5G radio specifications: pre-commercial trials continue full steam ahead*, (July 11, 2016), http://www.verizon.com/about/news/verizon-first-us-carrier-complete-5g-radio-specifications-pre-commercial-trials-continue-full.

[71] News Release, Verizon, *Verizon to deliver 5G service to pilot customers in 11 markets across U.S. by Mid 2017* (Feb. 22, 2017) ("Verizon 5G Pilot News Release"), http://www.verizon.com/about/news/verizon-deliver-5g-service-pilot-customers-11-markets-across-us-mid-2017.

Other companies are following suit. AT&T recently described its many efforts to deploy 5G services, and noted that it had "announced aggressive 5G evolution plans for 2017 and beyond."[72] T-Mobile just announced that it will "deliver true nationwide Mobile 5G coverage" using multiple spectrum bands including its recently purchased 600 MHz licenses.[73] Sprint has announced plans to test 5G and has been continuing to deploy infrastructure to support 5G.[74] Following its demonstration with Nokia of 5 Gbps speeds on 28 GHz spectrum, U.S. Cellular achieved peak speeds of 9 Gbps at a distance of 787 feet in its latest 5G trial with Ericsson.[75] This competition in the 5G space is good for American consumers and a boon to the U.S. economy.

Advertising as Indicia of Fierce Competition. As consumers, we are all aware that wireless providers also engage in aggressive marketing efforts to inform consumers about their service offerings and network quality, in order to maintain existing customers and lure subscribers away from competitors. For example, Verizon has aired commercials highlighting its unlimited data plan along with its unrivaled network quality.[76] In fact, all major competitors have been actively engaged in advertising battles. Wireless providers are among the biggest advertisers in the United States – according to one report, in 2016 Verizon and AT&T were the third and fourth largest

---

[72] Applications of AT&T Mobility Spectrum LLC and FiberTower Corporation for Transfer of Control of 24 GHz and 39 GHz licenses, File No. 0007652635, Public Interest Statement at 5 (Feb. 13, 2017).

[73] News Release, T-Mobile, *T-Mobile Announces Plans for Real Nationwide Mobile 5G,* (May 2, 2017), https://newsroom.t-mobile.com/news-and-blogs/nationwide-5g.htm.

[74] RCR Wireless News, *Sprint 2017 Plans Include More 3CCA, Small Cells, and 5G Prep* (Jan. 3, 2017), http://www.rcrwireless.com/20170103/carriers/sprint-2017-plans-include-more-3cca-small-cells-and-5g-prep-tag2.

[75] Diana Goovaerts, *U.S. Cellular Hits 9 Gbps in 5G Trials With Ericsson at 15 GHz*, WirelessWeek (Dec. 16, 2016), https://www.wirelessweek.com/news/2016/12/us-cellular-hits-9-gbps-5g-trials-ericsson-15-ghz.

[76] YouTube Video, Verizon Commercial 2017 Thomas Middleditch Drop the Mic (Feb. 15, 2017), https://www.youtube.com/watch?v=t3zptG2nVmM.

advertisers in the United States.[77] The volume of wireless ads affirms that no provider takes customers for granted. The wireless industry's advertising campaigns serve to underscore the intensity of its efforts to attract and retain customers.

B. Increasing Competition from MVNOs and Non-Traditional Sources Continues to Promote a Dynamic Consumer Experience.

The dynamic consumer experience for wireless services results from numerous and diverse participants across the mobile ecosystem – from existing mobile carriers and MVNOs to new entrants and emerging non-traditional sources of competition. Companies are exploring innovative business models to develop new platforms and services to attract and retain customers, expanding consumer options and continuing to improve the mobile experience.

1. Consumers Can Choose From a Diverse Selection of Facilities-Based Operators and MVNOs.

The wireless marketplace includes a wide range of providers offering services under a variety of business models. There are 127 facilities-based service providers ranging in size from local to regional to nationwide.[78] Dozens of MVNOs and other sources of mobile connectivity are providing an assortment of additional alternatives. Key segments of the wireless market, which we describe further below, all contribute to the competitive landscape of the mobile industry.

Nationwide Facilities-Based Providers Enhance Service Quality and Compete Intensively. Four "nationwide" providers – Verizon, AT&T, T-Mobile, and Sprint – have networks that cover a significant portion of the country and offer facilities-based service to nearly all Americans. Approximately 97.9 percent of the U.S. population has wireless coverage from three or more

---

[77] Mark Bergen & Joe Bayes, *Google Ad Crisis Spreads as Biggest Marketers Halt Spending*, Bloomberg (Mar. 22, 2017), https://www.bloomberg.com/news/articles/2017-03-22/at-t-halts-spending-on-some-google-ads-after-youtube-controversy.

[78] *See* Industry Analysis and Technology Div., FCC, *Voice Telephone Services: Status as of June 30, 2016*, at 10, Table 2 (Apr. 2017), http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0421/DOC-344500A1.pdf.

service providers, and 99.7 percent of the population is covered by LTE.[79] Providers, moreover, are busy deploying advanced LTE technology such as LTE Advanced (LTE-A), LTE Category M1 (LTE-M), and LTE Unlicensed (LTE-U) to support faster speeds for consumers, greater capacity, and IoT applications.[80] As noted above, providers also are already investing heavily in 5G.

Regional and Local Facilities-Based Providers Expand Consumer Choice. Scores of regional and local facilities-based providers help shape the competitive landscape and elevate the consumer experience. Regional carriers like U.S. Cellular and C Spire, the fifth and sixth largest facilities-based wireless carriers in the United States, have a substantial market presence and impact. For example, U.S. Cellular's network serves customers in 23 states and covers a total population of 32 million,[81] nearly the population of Canada.[82] U.S. Cellular has completed its transition to 4G LTE, which covers 99 percent of its subscribers, and plans to begin deployment of

---

[79] *Nineteenth Report*, 31 FCC Rcd at 10562, 10564 ¶¶ 37, 39, Charts III.A.1 and III.A.2.

[80] *See, e.g.*, Verizon Wireless, *Verizon LTE Advanced*, https://www.verizonwireless.com/featured/lte-advanced/ (last visited May 4, 2017) ("Verizon LTE Advanced covers more than 450 U.S. cities"); Mobile World Live, *Verizon Beats AT&T to First US-Wide LTE-M Launch* (Mar. 31, 2017), https://www.mobileworldlive.com/featured-content/home-banner/verizon-beats-att-to-first-us-wide-lte-m-launch/; Mobile World Live, *AT&T Gears up for LTE-M Roll-Out* (Jan. 4, 2017), https://www.mobileworldlive.com/featured-content/top-three/att-turns-attention-to-lte-m-roll-out/; Press Release, T-Mobile, *T-Mobile Continues to Boost Capacity for Customers with LTE-U Launching in Spring 2017* (Feb. 22, 2017), https://newsroom.t-mobile.com/news-and-blogs/lte-u-launch.htm; Wireless Week, *T-Mobile Preps for "Record-Breaking" 600 MHz Launch* (Apr. 19, 2017), https://www.wirelessweek.com/news/2017/04/t-mobile-preps-record-breaking-600-mhz-launch; The Verge, *Sprint Has Turned on Faster LTE for the iPhone 7 and Galaxy S7* (Feb. 2, 2017), http://www.theverge.com/circuitbreaker/2017/2/2/14489586/faster-sprint-lte-advanced-speeds-iphone-7-galaxy-s7-data.

[81] United States Cellular Corporation, Annual Report (Form 10-K) at 1 (Feb. 24, 2017), http://d18rn0p25nwr6d.cloudfront.net/CIK-0000821130/4f491052-823e-4722-a6b4-dcba8c0cd0d6.pdf ("U.S. Cellular Report").

[82] Government of Canada, Statistics Canada, *Population by year, by province and territory (Number)* (36.2 million in 2016), http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/demo02a-eng.htm (last visited May 7, 2017).

Voice over LTE in 2017.[83] It also has begun testing 5G technology.[84] In addition, U.S. Cellular recently won 188 600 MHz licenses, the third largest number of licenses won by an applicant.[85] C Spire's primary service area is located in the Southeastern United States. It has deployed 4G LTE to well over 250 markets and continues to invest in boosting capacity and speeds.[86] Dozens of smaller regional and local facilities-based carriers also continue to drive competition, such as Blue Wireless, Bluegrass Cellular, Carolina West Wireless, Choice Wireless, GCI Wireless, Inland Cellular, Pine Belt Cellular, SI Wireless d/b/a MobileNation, Southern Linc, and Union Wireless, many of which have or are deploying 4G.[87]

Many smaller regional and local carriers have partnered with larger carriers to help accelerate deployment of 4G LTE in rural or underserved areas where the cost of building networks previously may have been prohibitively expensive. For example, Verizon has been able to deliver 4G LTE wireless technology to even the smallest towns and rural counties by working with its LTE in Rural America ("LRA") partners, who build and maintain their own high-quality 4G LTE mobile

---

[83] *See* U.S. Cellular Report at 13.

[84] *See id.*

[85] Incentive Auction Closing and Channel Reassignment Public Notice, DA No. 17-314, Appendix B (Apr. 13, 2017) ("*Incentive Auction Winners Public Notice*").

[86] News Release, C Spire, C Spire Delivers Wireless Network Broadband Boost with Maximum Range LTE (Apr. 6, 2017), https://www.cspire.com/company_info/about/news_detail.jsp?entryId=27800004; C Sprire, Home, https://www.cspire.com/company_info/about/more_info.jsp (last visited May 3, 2017); C Spire, Our Network, https://www.cspire.com/company_info/about/network/ (last visited May 3, 2017). C Spire (under the name of Cellular South Licenses, LLC) also won 11 licenses in the recent Incentive Auction. *Incentive Auction Winners Public Notice*, Appendix B.

[87] *See, e.g.,* Inland Cellular Press Release, *Inland Cellular Brings Expanded 4G LTE Services to Walla Walla* (Oct. 10, 2016), http://inlandcellular.com/inland-cellular-brings-expanded-4g-lte-services-to-walla-walla/; MobileNation, Network Coverage, http://www.siwirelessco.com/coverage.php#MobileNationNetwork (last visited May 3, 2017); Southern Linc, *LTE is on its way to Southern Link customers*, https://www.southernlinc.com/lte/ (last visited May 3, 2017).

broadband networks using 700 MHz and AWS-1 spectrum leased from Verizon, along with Verizon technical support. Verizon's LRA partners use their own brands and have their own customers. The LRA program covers more than 226,000 square miles across 172 rural counties in 17 states. Sprint is partnering with smaller carriers to accelerate 4G LTE deployment through its Rural Roaming Preferred Provider program.[88] And as evidenced by the FCC's own data showing that 99.7 percent of the U.S. population has access to 4G LTE,[89] these opportunities have extended the reach of LTE coverage to rural areas throughout the country and supported the provision of competitive mobile services by regional and local providers.

MVNOs Provide Additional Competition and Innovation. MVNOs play an important competitive role in the marketplace. MVNOs target niche submarkets and demographics, offering prepaid services and other low cost options and innovating in shared data and rollover data plans, Wi-Fi calling, and other areas.[90] They routinely use specialized customer care and content as differentiators. "By building brands and rolling out services to consumers, MVNOs help broaden and deepen markets" despite the lack of spectrum or network infrastructure.[91] MVNOs also get "high marks from customers across the board – overall satisfaction, pricing, network quality and

[88] Fierce Wireless, *Sprint: 16 of 30 Rural LTE Roaming Partners Have Now Launched LTE Service* (May 20, 2015), http://www.fiercewireless.com/wireless/sprint-16-30-rural-lte-roaming-partners-have-now-launched-lte-service.

[89] *Nineteenth Report*, 31 FCC Rcd at 10564 ¶ 39, Chart III.A.2.

[90] 451 Research, *US mobile virtual network operators at a crossroads* (Feb. 27, 2017), https://451research.com/report-short?entityId=91715&referrer=marketing ("451 Research").

[91] The Economic Times, *MVNOs to bring real, virtual benefits* (Apr. 1, 2016), http://blogs.economictimes.indiatimes.com/et-editorials/mvnos-to-bring-real-virtual-benefits/ ("The Economic Times"); *see also* J.D. Power, News Release, *Rollover, Unlimited Data Plans Translate to Higher Satisfaction, J.D. Power Finds* (Feb. 16, 2017), http://www.jdpower.com/press-releases/2016-us-wireless-purchase-experience-fs-nc-performance-studies-vol-1 ("Full-service carriers are feeling the pressure from mobile virtual network operators' lower-priced plans.").

more."[92] One commentator recently estimated there were as many as 108 MVNOs in the United States.[93]

MVNO Tracfone is the largest MVNO in the United States and ranks fifth in subscribers among all providers of mobile service, facilities-based or otherwise, offering almost a dozen prepaid brands.[94] Along with Tracfone's dedicated customer support system, it has agreements with all of the nationwide carriers, allowing it to provide robust voice, text, and broadband services wherever those providers operate.[95] And, with the growth of the MVNO marketplace, nationwide and regional providers compete to provide wholesale services to MVNOs.

2. Newer Providers are Intensifying Competition.

In addition to the provider segments described above, the Commission's competitive analysis also must account for non-traditional suppliers of connectivity and competition. Emerging rivals offer services and applications that are both complements and substitutes, driving still more competition and choice for consumers.[96]

Wi-Fi Access is Drawing New Competitors. Globally, the total number of public Wi-Fi hotspots is expected to grow six-fold from 94.0 million in 2016 to 541.6 million by 2021.[97] In the United States alone, analysts estimate that there will be more than 75 million hotspots in 2018, an

---

[92] 451 Research.

[93] The Economic Times.

[94] *See Nineteenth Report*, 31 FCC Rcd at 10540 ¶ 9 (noting that Tracfone is the largest MVNO with 26 million subscribers) & 10543 ¶ 14, Table II.B.1 (noting that the largest regional service provider has roughly 5 million subscribers).

[95] Tracfone Wireless, Inc.'s Petition for Designation as a Lifeline Broadband Provider, WC Docket No. 09-197, at 2 (Oct. 31, 2016).

[96] *See, e.g.*, *Thirteenth Report*, 24 FCC Rcd at 6198-6204 ¶¶ 12-28, 6249 ¶ 125, 6264-70 ¶¶ 164-76 (describing how many types of service providers contribute to a competitive market, and how they compete on multiple levels, including price, coverage, service quality, speeds, and content).

[97] Cisco VNI at 20.

increase of more than 6,000 percent since 2013.[98] In 2016, 60 percent of total worldwide mobile data traffic was offloaded onto fixed networks through Wi-Fi or femtocells.[99] And not surprisingly, Wi-Fi usage is increasing. In the United States, the amount of offloaded traffic is projected to increase from 64 percent in 2016 to 70 percent by 2021.[100] U.S. consumers with smartphones also spend roughly half of their time connected to Wi-Fi rather than mobile networks.[101]

A number of companies are taking advantage of the growing availability of Wi-Fi by offering "Wi-Fi First" products, such as Google Fi, Republic Wireless, FreedomPop and Scratch Wireless.[102] These products, which default to a Wi-Fi connection whenever that signal is available and/or strongest, offer a competitive alternative for consumers.

Cable providers such as Comcast, which has 16 million hot spots, also may capitalize on Wi-Fi access points when rolling out their new wireless services.[103] In announcing its new wireless product, Comcast noted its hotspots create a unique network access model and that it is committed to improving the Wi-Fi experience for customers by making it easier for them to auto-connect to its

---

[98] iPass, *Wi-Fi Growth Map*, (citing Maravedis Wireless Infrastructure Analysts), http://www.ipass.com/wifi-growth-map/ (last visited May 4, 2017).

[99] Cisco VNI at 1.

[100] Cisco VNI Mobile Forecast Highlights.

[101] Diana Goovaerts, *Despite Rise of Unlimited Data, Wireless Users Still on WiFi Half the Time*, Wireless Week (Apr. 19, 2017), https://www.wirelessweek.com/data-focus/2017/04/despite-rise-unlimited-data-wireless-users-still-wifi-half-time.

[102] *See, e.g.*, Google, *Welcome to Project Fi, a Wireless Service From Google*, https://fi.google.com/about/ (last visited May 4, 2017); Republic Wireless, *WiFi Calling*, https://republicwireless.com/wifi-calling/ (last visited May 4, 2017); FreedomPop, *Unlimited Talk, Text and Data at millions of WiFi Hotspots Nationwide*, https://www.freedompop.com/nationwide-wifi (last visited May 4, 2017); Scratch Wireless, https://www.scratchwireless.com/ (last visited May 4, 2017).

[103] Brian Fung, *Comcast wants be your new cellphone carrier. Here's everything you need to know*, Washington Post, Apr. 6, 2017, https://www.washingtonpost.com/news/the-switch/wp/2017/04/06/comcast-wants-be-your-new-cellphone-carrier-heres-everything-you-need-to-know/?utm_term=.5dde6160808f.

hotspots.[104] Charter also is investing in densifying its Wi-Fi footprint, and has committed to deploy several hundred thousand additional public Wi-Fi hotspots in connection with its acquisition last year of Time Warner Cable and Bright House Networks.[105] And, Comcast and Charter have announced plans to work together on wireless services.[106]

Over-the-Top VoIP and Messaging Providers are Exerting Competitive Pressure. Mobile VoIP technologies and IP messaging platforms allow users to opt for a broadband-based voice or video call or messaging service that continues to place competitive pressure on wireless operators. Over-the-top applications and messaging options are transforming how businesses and consumers interact.[107] Indeed, with 77 percent of Americans owning smartphones (up from 35 percent in 2011) and 69 percent using social media,[108] consumers are flocking to Skype, FaceTime, Facebook Messenger, Apple Messages, WhatsApp, Viber, LINE Mobile Messaging, SnapChat, Google Hangouts, Voxer, and others.[109] The popularity of messaging platforms has increased notably in the

---

[104] Goldman Sachs, *Comcast Corp.: Key takeaways from Comcast's wireless investor meeting*, at 3 (Apr. 6, 2017).

[105] Mike Dano, Fierce Wireless, *'New Charter' to offer 300,000 public Wi-Fi hotspots, and maybe an MVNO service* (May 12, 2016), http://www.fiercewireless.com/wireless/new-charter-to-offer-300-000-public-wi-fi-hotspots-and-maybe-mvno-service.

[106] Dana Mattioli & Shalini Ramachandran, *Comcast, Charter Strike Wireless Partnership*, Wall St. J., May 8, 2017.

[107] GSMA 2016 at 30.

[108] Pew Research Center, *Mobile Fact Sheet* (Jan. 12, 2017), http://www.pewinternet.org/fact-sheet/mobile/; Pew Research Center, *Social Media Fact Sheet* (Jan. 12, 2017), http://www.pewinternet.org/fact-sheet/social-media/.

[109] Leslie Walker, *The 10 Best Mobile Messaging Apps*, Lifewire (Apr. 10, 2017), https://www.lifewire.com/best-mobile-messaging-apps-2654839; Statista, *Most Popular Mobile Messaging Apps Worldwide as of January 2017, Based on Number of Monthly Active Users (in Millions)*, https://www.statista.com/statistics/258749/most-popular-global-mobile-messenger-apps/ (last visited May 4, 2017).

past year in North America, where 57 percent reported using messaging platforms in 2016, up from 34 percent in 2015.[110]

C. The Competitive Marketplace is Driving Rising Consumer Satisfaction.

As carriers fight to win and retain customers in a vigorously competitive mobile ecosystem, overall wireless consumer satisfaction levels remain high – another important signifier of a well-performing competitive market. Surveys of wireless consumer opinion and the low level of customer complaints to the FCC show that wireless competitors are succeeding in their efforts to meet customers' needs and expectations.

1. Surveys Consistently Report High Levels of Satisfied Customers.

The wireless industry continues to enjoy high levels of customer satisfaction. Consumer Reports' most recent rankings report that all 11 cell phone carriers that it reviewed received scores reflecting that consumers were "fairly well satisfied" or "very satisfied."[111] The American Customer Satisfaction Index ("ACSI") also found that "[a]ll aspects of the wireless customer experience are better than they were in 2015."[112] Indeed, wireless consumer satisfaction has increased since 2009 and continues to remain high.[113]

Similarly, J.D. Power and Associates ratings show that wireless consumer satisfaction is high and increased from last year in several areas. Overall satisfaction with the wireless purchase process has significantly improved, with a score of 845 out of 1000 among full-service wireless

---

[110] GSMA 2016 at 30.

[111] Consumer Reports, U.S. cell phone carriers, http://www.consumerreports.org/products/us-cell-phone-carriers/ratings-overview/ (last visited May 3, 2017).

[112] ACSI Telecommunications Report 2016 at 10.

[113] American Customer Satisfaction Index, *Benchmarks by Industry – Wireless Telephone Service*, http://theacsi.org/index.php?option=com_content&view=article&id=147&catid=&Itemid=212&i=Wireless+Telephone+Service (last visited May 4, 2017).

customers (an increase of 11 points since 2016 findings).[114] Overall satisfaction with wireless customer care also improved, with a score of 814 out of 1000 among full-service wireless customers (a 10-point increase) and a score of 756 out of 1000 among non-contract customers.[115] Network quality also remains high – studies by J.D. Power scored 15 problems per 100 calls in 2008, which decreased to 13 problems per 100 calls in 2016.[116] In comparison, overall customer satisfaction is notably lower with U.S. retail banks with a score of 793 out of 1000.[117]

In a study on the importance of customer service, J.D. Power found that "[w]ithout exception, J.D. Power finds a strong relationship across industries between the level of customer satisfaction and demand-side benefits, such as repurchase intent rate."[118] To that end, Verizon has invested heavily in customer service operations to meet customers' needs, with over 1,600 retail

---

[114] Press Release, J.D. Power, *Rollover, Unlimited Data Plans Translate to Higher Satisfaction, J.D. Power Finds* (Feb. 16, 2017), http://www.jdpower.com/press-releases/2016-us-wireless-purchase-experience-fs-nc-performance-studies-vol-1.

[115] Press Release, J.D. Power, *Wireless Customers with Unlocked Phones More Satisfied with Customer Care Process Despite Experiencing Higher Contact Rates* (Feb. 2, 2017), http://www.jdpower.com/press-releases/jd-power-2017-us-wireless-customer-care-full-service-performance-study%E2%80%94volume-1-and.

[116] *Thirteenth Report*, 24 FCC Rcd at 6286-87 ¶ 214; News Release, J.D. Power, *Wireless Network Data Speeds Improve but Not Incidence of Data Problems, J.D. Power Finds* (Mar. 2, 2017), http://www.jdpower.com/press-releases/jd-power-2017-us-wireless-network-quality-performance-study.

[117] Press Release, J.D. Power, *Big Banks Show Significant Gains in Customer Satisfaction as Midsize Banks Decline and Regionals Plateau, J.D. Power U.S. Retail Banking Study Finds* (Apr. 28, 2016), http://www.jdpower.com/press-releases/2016-us-retail-banking-satisfaction-study.

[118] J.D. POWER AND ASSOCIATES, BEYOND SATISFACTION: J.D. POWER 2012 CUSTOMER SERVICE CHAMPIONS, BRANDS THAT DELIVER SERVICE EXCELLENCE TO MAXIMIZE BUSINESS RESULTS, Executive Summary at 3 (Mar. 2012), https://pictures.dealer.com/jdpower/12ea79a70a0d02b7014443193be6f066.pdf.

locations and 24/7 account access.[119] Customers also may utilize self-serve options, including on-line, handset-accessible, or interactive voice response call-in systems, to address their needs.[120]

Even so, as customer experience satisfaction remains high, churn rates were also high in the fourth quarter of 2016,[121] reflecting low switching costs and intense rivalry among providers.

2. Consumer Complaints are Minimal.

Based upon a review of the Commission's data on informal complaints, wireless-related complaints are extremely low in relation to the total number of wireless subscribers. According to the Commission's online Consumer Help Center, in 2016 there were 99,681 informal complaints filed in connection with wireless service.[122] So in 2016, the number of wireless-related informal complaints represented just one complaint for every 4,825 wireless connections in the United States.[123]

D. The U.S. Market Continues to Lead the World.

U.S. wireless providers continue to be world leaders in network deployment and innovation. As noted, Verizon and others have invested more than $300 billion in their networks over the last

---

[119] *See* Verizon, *A clear purpose. A new identity.*, http://www.verizon.com/about/sites/default/files/Verizon_Fact_Sheet.pdf (last visited May 4, 2017).

[120] Verizon Support, https://www.verizonwireless.com/support/ (last visited May 4, 2017).

[121] For example, AT&T's overall churn rate at the end of 2016 was 1.71 percent versus 1.50 percent in 2015. AT&T Inc., Current Report (Form 8-K) at 5 (Jan. 25, 2017), https://www.att.com/Investor/Earnings/4q16/8k_4q16.pdf. Verizon, T-Mobile and Sprint's postpaid churn rates were .96, 1.46, and 1.62 percent, respectively, at the end of 2015. At the end of 2016, these rates had changed to 1.10, 1.28, and 1.67, respectively. Cowen and Co., *Wireless Quarterly – Post 4Q16*, at 15 (Mar. 17, 2017).

[122] CGB – Consumer Complaints Data, https://opendata.fcc.gov/Consumer-and-Government-Affairs/CGB-Consumer-Complaints-Data/3xyp-aqkj/data#column-menu (last visited May 4, 2017). Complaints relating to telemarketers or spam were excluded as they do not pertain to wireless carrier services or practices.

[123] Cisco estimates that in the United States there were 481 million mobile devices and connections in 2016. Cisco VNI Mobile Forecast Highlights.

decade.[124] In 2016, 62 percent of North American connections were 4G, nearly double that of Europe at 33 percent and more than double that of the Asia Pacific region at 27 percent.[125] And in 2016, North America had the highest smartphone usage by region, almost twice as high as Western Europe, the region with the second highest usage.[126] The North American region is expected to continue to lead in 4G, doubling the global percentage of 4G connections in 2020.[127]

And 5G is coming. Fast. Thanks to the FCC's forward-looking policy initiatives in millimeter wave spectrum and infrastructure streamlining, U.S. carriers are expected to be among the first to launch commercial 5G networks.[128] By 2022, 25 percent of North American mobile subscriptions are expected to be 5G, compared to only 10 percent in Asia Pacific and 5 percent in Western Europe.[129] The U.S. wireless industry already is looking to the future and building on its many years of research and development to deploy 5G. As noted above, Verizon recently announced it will be rolling out pre-commercial 5G service to pilot customers in 11 U.S. markets in 2017.[130] And AT&T, T-Mobile, Sprint, and U.S. Cellular continue to move forward on 5G market testing and trials.[131]

---

[124] CTIA 2015 Wireless Annual Survey.

[125] GSMA, The Mobile Economy 2017, 8-9 (2017) ("GSMA 2017") https://www.gsmaintelligence.com/research/?file=9e927fd6896724e7b26f33f61db5b9d5&download.

[126] Ericsson Mobility Report at 12.

[127] GSMA 2017 at 8-9.

[128] *Id.* at 16.

[129] Ericsson Mobility Report at 9.

[130] Verizon 5G Pilot News Release.

[131] News Release, AT&T, AT&T Details 5G Evolution (Jan. 4, 2017), http://about.att.com/story/att_details_5g_evolution.html; Jaun Pedro Tomás, *5G trials in the U.S.*, RCRWireless News (Feb. 16, 2017), http://www.rcrwireless.com/20170216/carriers/5g-trials-u-s.

III. COMPETITION FOR SPECTRUM IS INTENSE

The Commission has taken significant steps toward making necessary spectrum available in recent years. Just last month, the Commission concluded the first-of-its-kind two-sided incentive auction to repurpose 600 MHz broadcast spectrum for flexible, exclusively licensed use according to a market-based mechanism.[132] The Commission is also nearing the conclusion of a years-long proceeding to make 3.5 GHz mid-band spectrum available for flexible use under a three-tiered sharing regime.[133] And last year, the Commission moved very rapidly to revise its rules to make millimeter wave spectrum available for high speed, low latency, densely deployed wireless use.[134] Still, with demand for mobile data continuing to skyrocket and data hungry 5G networks on the horizon, policymakers must bring more low-, mid-, and high-band spectrum to market and make it available to all providers.

A. FCC Auctions Have Distributed Licensed Spectrum to a Broad Array of Competitors.

The Commission recently auctioned 70 MHz of licensed spectrum to a total of 50 different bidders in the 600 MHz broadcast incentive auction.[135] The results of the auction, like previous auctions, show that a wide range of companies can gain access to spectrum for wireless broadband and choose to purchase licenses based on their particular spectrum needs. As one public interest advocate noted, "among the three largest buyers are potential new market entrants, Comcast and

---

[132] *Incentive Auction Winners Public Notice*, Appendix B.

[133] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011 (2016) ("*CBRS Second Report and Order*").

[134] *Spectrum Frontiers Order*, 31 FCC Rcd 8014.

[135] FCC, *The Incentive Auction 'By the Numbers'*, (Apr. 13, 2017) ("*Incentive Auction Fact Sheet*"), http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0413/DOC-344398A1.pdf.

DISH, and a scrappy competitive carrier, T-Mobile."[136] Of the 50 winning bidders, 23 are seeking rural bidding credits and 15 are seeking small business bidding credits.[137] Non-nationwide carriers won nearly 45 percent of licenses in the auction.[138] And of the two largest nationwide providers, only AT&T bid on licenses, and accounted for less than one percent of the licenses sold.

The incentive auction results provide further evidence that, as Verizon explained to the Commission under then-Chairman Wheeler,[139] a spectrum set-aside was not needed to ensure that a wide variety of competitors were able to acquire low-band spectrum in the auction. Following the auction, Sprint continues to have the largest amount of sub-3 GHz spectrum, at 204 MHz total, with AT&T close behind at 169 MHz.[140] T-Mobile and Verizon now have nearly the same amount of total spectrum holdings, at 111 MHz and 113 MHz respectively.[141] DISH also now has nearly 100 MHz of total spectrum.[142]

B. Unlicensed Spectrum Helps Meet Increasing Consumer Demand for Data and Drives Additional Competition.

To meet the growing demand for mobile traffic, competitors are also looking beyond traditional exclusive-use licensed spectrum. Carriers rely on Wi-Fi to offload traffic from their mobile networks, as explained above. But of course, access to unlicensed spectrum is not just about wireless data offload. The spectrum available for unlicensed services is free of charge and easily

---

[136] Press Release, New America Foundation, Open Technology Institute, *Wireless Future Statement on the FCC Broadcast Incentive Auction* (Apr. 13, 2017), https://www.newamerica.org/oti/press-releases/wireless-future-statement-fcc-broadcast-incentive-auction/.

[137] *Incentive Auction Fact Sheet*.

[138] *Incentive Auction Winners Public Notice*.

[139] Opposition of Verizon to Petitions for Reconsideration, *Policies Regarding Mobile Spectrum Holdings*, WT Docket No. 12-269 (filed Sept. 24, 2014).

[140] Deutsche Bank, *600 MHz auction results announced; implications for Comm. Services stocks* at 1 (Apr. 14, 2017).

[141] *Id.*

[142] *Id.*

accessible. New technologies such as LTE-U and Licensed Assisted Access allow carriers to combine the benefits of licensed spectrum, including security and mobility, and the increased capacity enabled by unlicensed spectrum. Earlier this year, the Commission authorized the first LTE-U devices in the 5 GHz band, paving the way for new innovation.[143] There is also a version of LTE-U, MulteFire, which offers LTE-based technology for small cells operating solely in unlicensed spectrum, thereby opening up the technology for entities other than traditional licensed wireless carriers.[144]

The substantial additional blocks of unlicensed spectrum the Commission is bringing to market will further drive innovation in products that capitalize on that spectrum, in turn driving more competition among existing providers, device suppliers, and new entrants. More than 500 MHz of spectrum in the 2.4 GHz and 5 GHz bands are already used for broadband access, and up to an additional 150 MHz will be available under the three-tiered sharing regime adopted in the 3.5 GHz band.[145] As a result of the incentive auction, the Commission made available a total of 14 MHz of low band spectrum for unlicensed use.[146] Last summer, the Commission made available an additional 7 GHz of unlicensed millimeter wave spectrum in the 64-71 GHz band which, when combined with the existing high-band unlicensed spectrum at 57-64 GHz, create a 14 GHz contiguous swath of unlicensed spectrum.[147]

---

[143] Julius Knapp, Chief, Office of Engineering and Technology, *OET Authorizes First LTE-U Devices*, FCC Blog (Feb. 22, 2017), https://www.fcc.gov/news-events/blog/2017/02/22/oet-authorizes-first-lte-u-devices.

[144] Multefire, http://www.multefire.org/about/ (last visited May 7, 2017) .

[145] *CBRS Second Report and Order*, 31 FCC Rcd 5011.

[146] News Release, FCC, *FCC Announces Results of World's First Broadcast Incentive Auction: 175 TV Stations, 50 Wireless Bidders Free Up 70 MHz for Mobile Broadband*, FCC (Apr. 13, 2017), http://transition.fcc.gov/Daily_Releases/Daily_Business/2017/db0413/DOC-344397A1.pdf.

[147] *Spectrum Frontiers Order*, 31 FCC Rcd 8014.

IV. CONCLUSION

In light of the data above demonstrating the vibrant market for wireless services, the Commission should find that the U.S. mobile market is subject to "effective competition" pursuant to Section 332(c)(1)(C) of the Communications Act.

Respectfully submitted,

VERIZON

By: /s/ Leora Hochstein

Leora Hochstein
Charla Rath

VERIZON
1300 I Street, NW
Suite 500 East
Washington, DC 20005
(202) 515-2535

William H. Johnson
Of Counsel

May 8, 2017